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***Organs Everywhere* 2017, (5), 100-107.**

# Design Hydromancy

Rachel Armstrong

At a time when a woman was valued by the man she married, and when childbirth was the leading cause of death amongst fertile women—with maternal mortality rates being as high as forty percent in some societies—adolescent girls could glimpse a sense of their fate by walking backwards up a staircase at nighttime, holding a candle and a vessel of water. A young woman would see in the reflection either the face of the man she would marry, or a skull, which signified that she would die before finding true love. Of course, what the inevitably terrified teenager would see was an incredibly distorted view of her own face. Yet such a familiar image appeared "otherly" under the flickering and inconstant candlelight. Her trembling hand inevitably sent waves across the reflective surface twisting its contours, and the rush of air that passed through the stairways produced further disturbances that tore the image to shreds. If you've ever walked through a hall of mirrors, you'll know exactly how uncanny, or frightening, such distortions can be. Using reflective surfaces to glimpse alternate realities is an ancient art that Nostradamus himself is reputed to have employed to make his predictions. Practices such as hydromancy, which specifically uses water surfaces as a visualization tool, seek portals that may admit access to other worlds, from which new knowledge can be obtained. The liquid interface takes a symbolic form that can be interpreted by the scryer as omens of things that are yet to come. In many ways, the scryer's notion of "the future" is very different to the deterministic hypothesis that is characteristic of modern experimental science. While both practices seek to predict events, mathematical projections are reached with trajectories that the average person can do nothing about, because algorithms embody a Platonic truth beyond human reach or influence. In contrast, the scryers empower their clients by presenting them with a set of potentialities. This places the clients in a tangible position of influence, whereby they have a chance to reshape outcomes through remedial action, like the miser Scrooge in Charles Dickens' cautionary tale *A Christmas Carol*. Perhaps a young girl confronted by the image of her death may decide to "defy the stars" as Romeo did for the love of Juliet, or "play it safe" and devote herself to a convent. Such approaches do not make decision-making easy, or reduce risks, but scryers do give a measure of power back to their clients, and that is presumably why their services were much sought-after.

In an age where design is increasingly populated with software imaging tools, we rely on mathematical projections to conjure up possibilities. Being our methods so virtual, they become removed from our ability to influence them in the real world. The production of images is separated and distanced from materiality. My work explores how we may precipitate new—and empowering—aesthetic possibilities by forging new relationships with matter. The aim is to become co-designers of events with the material realm, extending our influence in ways that are not pre-determined by existing toolsets.

To reach escape velocity from current software imaging systems, I have been exploring the imaging techniques produced by an emerging field of computation that seeks liberation from Turing codes and von Neumann architectures. This field is not yet fully defined and is situated within a set of experimental scientific

practices that may be described as natural computing, taking its name from Alan Turing's interest in the computational powers of Nature, especially in the production of patterns such as dappling.[1] Natural computing engages a wide spectrum of overlapping interests ranging from the digital modeling of biological systems, to the application of self-organizing chemical systems to "solve" more traditional problems such as the shortest route through a maze.[2]

**1—**
**A.M. Turing. "The Chemical Basis of Morphogenesis." *Philosophical Transactions of the Royal Society of London. Series B, Biological Sciences*, 237(641). (1952), pp.37-72.**

**2—**
**Natural computing also intersects with two other novel areas of computation. The first one is unconventional computing, which stems from Information and Communications Technology (ICT) and seeks to engage with programs that model their computational operations based on non-standard paradigms. In so doing, they seek more natural solutions for computer operations than are algorithmically possible. The second of these areas is morphological computing, which arises from the field of robotics and employs materials with nonlinear properties to "solve" engineering challenges differently.**

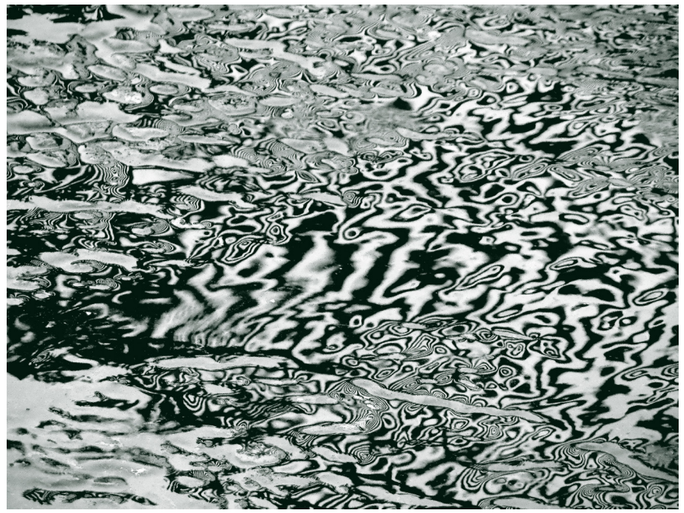
Within the range of natural computing practices, my research engages physical computing techniques that use the properties of nonlinear materials, which are present in crystal growth, intermolecular electron transfer systems, or in the instabilities at the oil/water interface. By being exquisitely sensitive to their environmental context, these platforms offer new opportunities for making images, structures and even to perform useful work. This receptiveness, which ensues from the field instabilities that exist at liquid interfaces, allows designers to co-shape their material performance and aesthetic qualities.

Over the last five years, I have immersed myself in a natural-computational world that deals with liquid interfaces, trembling surfaces and turbulent environments. My aim has been to witness and choreograph changes at the dynamic intersections between empowered nonhuman agencies. Such a window into the world at the level of interfaces has required a particular kind of engagement, which compelled me to observe these molecular events also at the human scale, so that they can be critiqued and applied in design contexts.

The air/water interface has been historically recognized as a gateway to other worlds. Distortions at the air/water interface have been used as a form of divination whose colour, ebb, flow, and quality of ripples produced by pebbles dropped in a pool created a language for prognostications.
Vortices in particular are regarded as spiritual and dimensional openings between parallel planes of existence. They typically exist where there are strong gradients across an interface, creating an environment that can defy gravity, bend light, scare animals, twist plant life into contorted shapes, and cause humans to feel “strange.”

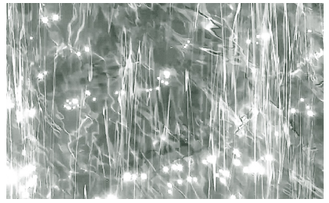
In Renaissance magic, hydromancy was considered as one of the forbidden arts that included chiromancy, necromancy, aeromancy and pyromancy. Powerful hydromancers were attributed with the ability to disrupt trade and therefore wealth by influencing ocean currents and conjuring monstrous weather conditions.

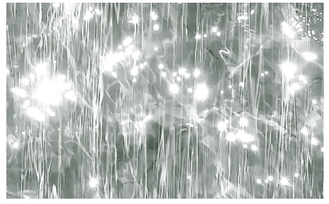
In the film *Constantine*, the medium, played by Keanu Reeves, journeys to Hell with the help of a black cat (believed to simultaneously exist between the two worlds) and by immersing his feet in a bowl of water, which becomes a portal. In the movie we are not shown the distortions of light, water and air that occur as Constantine makes his transition, yet it is precisely these distortions that are of great interest to me. While the narrative device of the movie is highly effective, I find myself wanting to see warped graphics produced by the interface between the worlds and speaking of an infernal place that could potentially be “real,” rather than a function of special effects. Perhaps in a similar manner to how the face of a young girl, contorted by fear and distorted by mischievous elements, produces such a completely alien countenance that it is not only unrecognizable but also strikes fear or delight into the heart of an observer—a Pygmalion or Medusa. In other words, I am interested in how the actual molecular forces that underpin natural computing generate images through variations in interfaces, which is akin to the practice of scrying, and in how such variations can be harnessed as a design

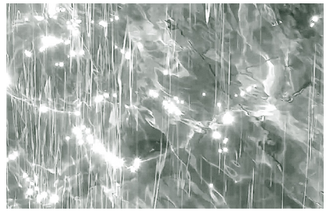


methodology. In this sense, engaging boundaries between unstable fields of activity produces a probabilistic aesthetic originating from ancient history. Yet, in an age of novel computing techniques, it is also possible to consider how the manipulation of images at boundaries may be relevant to a third millennial context.

Trembling domains of potentiality are continually produced at the light/water/air interface to produce direct and internal reflections of multiple bodies, which generate prototypes and sketches. Since my work is interested in using natural forces as gateways to explore new architectural possibilities, I regard the







disturbances at liquid interfaces as visualization tools for examining otherwise invisible networks of interactions, and their potential. The graphical outputs suggest possible relationships between fields that may evolve from ongoing exchanges into landscapes of possibility—transitional states of being that are shaped over time by their responses to elemental systems. At these sensitive interfaces, it is possible to observe the formation of tangible configurations, which are stretched out in time and space—and collapsed again—by natural computing agencies. In their unstable moments of existence, these fluid interfaces offer vistas that can be photographically recorded. As the images in these photographs extend out to make certain bonds in one dimension and withdraw from others in another, the liquid landscapes they display continually evolve, revealing fields of interactions within a probabilistic space. These images may be thought of as "elemental drawings," which can provide an alternative to the software packages that constrain the aesthetics of modern practices.

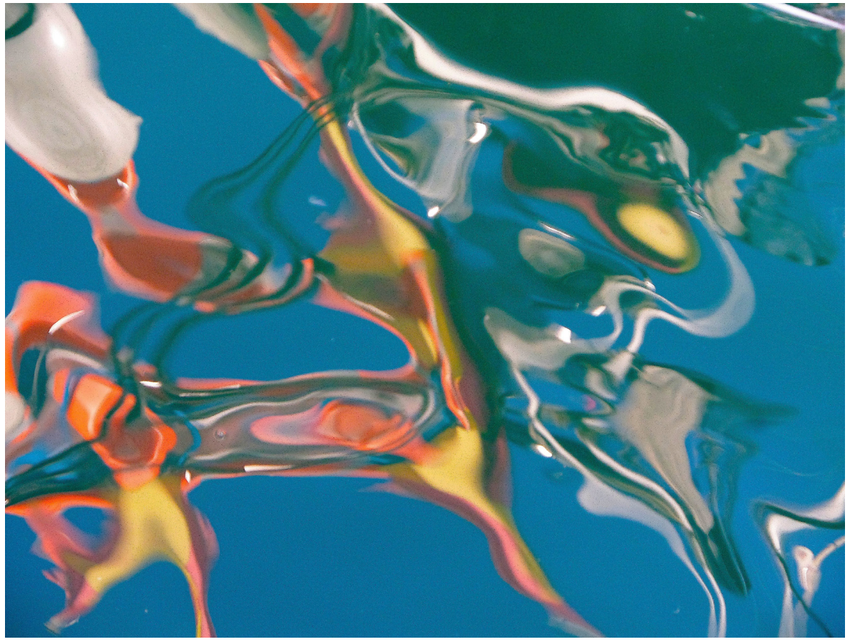
The choreography of light, water and air demonstrates the vibrancy and impact of what we would conventionally think of as invisible media, which bear little relevance to the production of objects. However, documentation of the light/water interface reveals incredible molecular forces at work, and transformative potential that could be employed for design purposes.

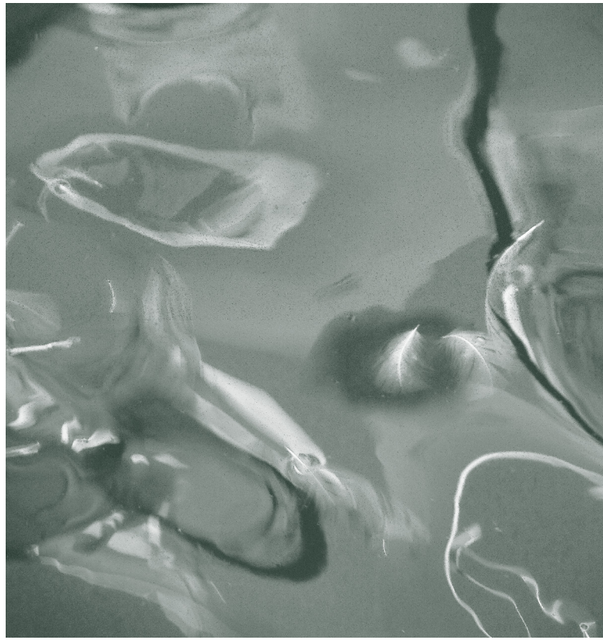
The movie stills on the left are details of the dynamic traces of directly and indirectly reflected light from one of the Alhambra fountains. The construction of fountains may be considered as a practice of building "natural computers" that, having been situated within a specific landscape, are concerned with the performance of water and its associated variables—sound, intensity, hue. Aberrations in the viewing system may be layered over the actual interface as an augmented reality. These particular images have a watercolor quality about them, and seem etched into virtual spaces that appear to exist between air and water.

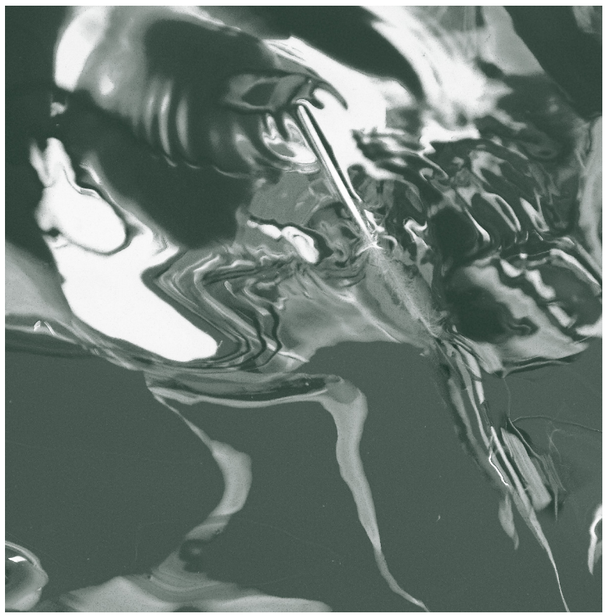
But we don't have to build *ad-hoc* devices to construct these images. The same processes are at work in the port of Malaga, where the Spanish flag has been playfully distorted and interlaced with trash.

In an architectural context, a form of Design Hydromancy can offer us possible new portraits for cities that, like Venice, are entangled with air/water/light interfaces. While I have worked with collaborators that focused on imagined formal outputs for self-organizing materials through projections of how such substances may be applied to classical buildings, as in GMJ's computer rendering of *Future Venice*, I have personally resisted modeling idealized interactions between these systems.

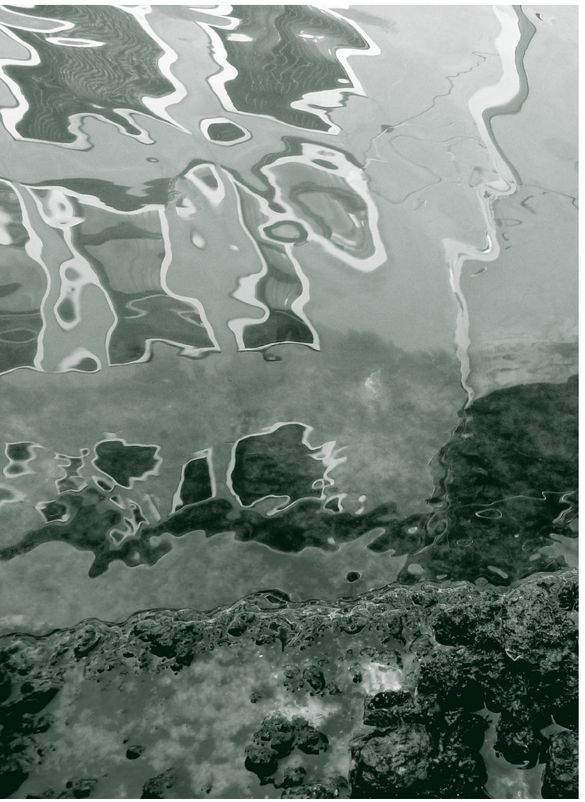
Rather, I have searched for alternate ways of graphically understanding these interfaces and the multiplicities they contain. Possibilities reside in exploring the "biological stones" of the city, where living materials that have been forged through marine ecologies of bacteria, algae and shellfish produce sculptural accretions. Using design hydromancy, it is possible to envision how such activity may shape the foundations of the city as a form of aquatic gardening. Yet, these are not

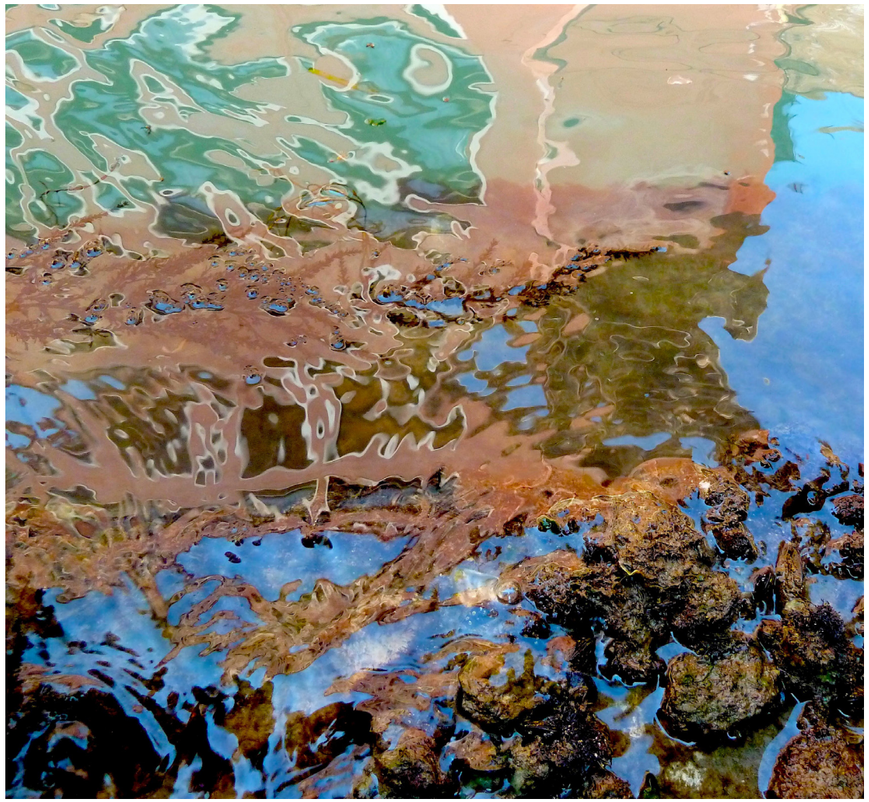




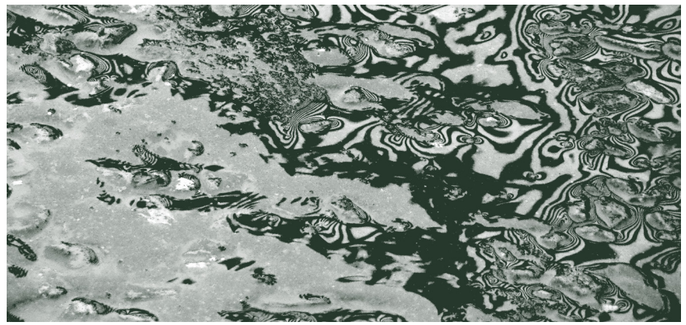


fictitious landscapes, but spring from the same kinds of spaces that give access to the parallel landscapes and worlds alluded to in Italo Calvino's "Invisible Cities." Although design scrying creates portals into alternate realities that do not yet exist, these realities are nascent and may be modeled, prototyped and even brought into existence through experimental architectural practices.[3]

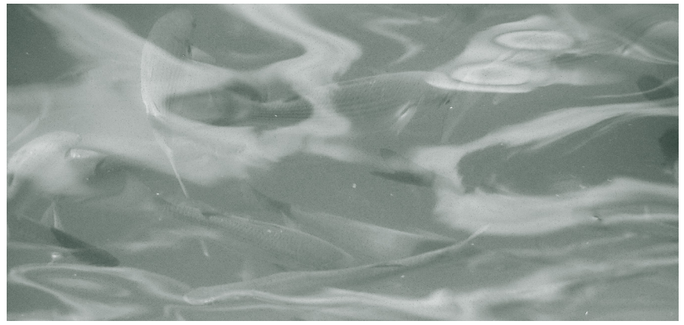




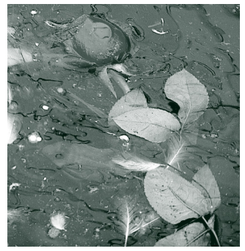
Design scrying is not limited to sites that are flooded with sunlight, but can be found just as readily on wet rainy days at interfaces between a surface and water, even when the light is minimal, like the interference patterns produced outside Edinburgh castle on this sheet of tarmacadam, which is immersed in a film of rainwater. Nor is design scrying limited to two dimensions, as a flat plane of imaging.



Rather, it conjures new kinds of sculptural relationships through different depths of viewing that allow an observer access to multiple dimensions, as in this shoal of fish swimming between moored boats in the port of Malaga. Here they are mixed in with the surface reflections of the distorted vessels, suggesting new relationships and habitats.



These images point to new terrains for architectural design and offer a way of reading what matter may do next. Yet, like the transitional states of chemistry, we are not observing constants but the highly variable and processual properties of matter. Furthermore, design hydromancy is not ephemeral or isolated, but also connects its liquid landscapes with recognizable objects, which, as they pass through them, obtain new significance. For example, a discarded rose becomes the tragic drowned figure of Ophelia. Or, feathers that are bathed in light suggest that an angel has just sunk beneath the waves.



While I am searching for formal articulation of these approaches, I am also resisting it at the same time, since it fossilizes them as a "style" or an "aesthetic." I am more interested in opening up access to an image-generating system that enables us to use alternative forms of computation in which it is possible to make new design moves without having to re-translate the graphics back into standard software languages. In this context, in order to immerse themselves in these alternate possibilities, designers need to be prepared to see the links and connections within the expansion and contraction of an ever mutating present, and to be aware of the significance of transitional states. In apprehending these principles for production, it is then necessary to establish the context for design scrying and, once immersed in the rapidly overlapping field interactions, to recognize and respond to an appropriate syntax through which design decisions can be made. This toolset does not generate fixed solutions, but helps visualize matter in a probabilistic context, where events and objects are equally important. How these fragments and slices of time and space are used is shaped by the aesthetics, values and agendas of the designer. In this way, designers are powerful mediums that, like Constantine, can travel through graphical wormholes and explore new worlds. At the right moment to return, the design scryers may be transformed by the insights of their experience but, unlike the scryers of old, they will have a photographic record of their encounters with which to empower their audiences.

**3—**
**Experimental Architecture is a visionary design practice that challenges existing tropes in architecture by proposing alternative realities. The term was coined by Peter Cook in 1970 in a book by that title and adopted as a working method by Lebbeus Woods. My work is situated within this field of inquiry by moving the realm of experimentation from the drawing board or computer into the laboratory, in order to make models and prototypes of possible new architectures.**